

Frosts.—In the various districts they were reported on the following dates: New England, 1st to 8th, 10th to 31st; Middle Atlantic States, 1st to 8th, 10th, 11th, 12th, 14th, 15th, 17th to 26th, 28th to 31st; South Atlantic States, 1st to 5th, 22nd to 26th, 30th, 31st; Florida Peninsula, Cedar Keys, 2d, 3d, 31st; East Gulf States, 2d, 3d, 23d; West Gulf States, 2d, 11th, 17th, 18th, 19th, 22d, 23d, 29th, 30th, 31st; Rio Grande Valley, 1st, 2d, 16th, 18th, 21st, 31st; Ohio Valley and Tennessee, 1st to 7th, 9th, 10th, 12th, 14th to 25th, 28th to 31st; Lower Lake Region, 1st to 31st; Upper Lake Region, 1st to 31st; Extreme Northwest, 1st to 31st; Upper Mississippi and Missouri Valleys, 1st to 31st; Northern Slope, 1st to 31st; Middle Slope, 1st to 6th, 8th to 31st; Southern Slope, 12th, 16th to 19th, 22d, 23d, 29th, 30th, 31st; Southern Plateau, 1st, 2nd, 4th to 31st; Middle Plateau, 1st to 4th, 8th, 9th, 10th, 13th to 31st; Northern Plateau, 3d, 7th, 12th, 13th, 15th, 16th, 19th to 25th; North Pacific Coast region, 9th to 12th, 15th to 22d, 25th, 27th to 30th; South Pacific Coast region, 1st, 3rd to 23d, 25th to 31st.

Ice.—Regarding its formation in the northern sections, this subject is considered elsewhere in the REVIEW under the head of *Ice in Rivers and Harbors*. The following are exceptional cases of ice formation in the southern sections of the country: Augusta, Ga., 2d, 23d; Jacksonville, Fla., 2d; Sloop Point, N. C., 2d; Portsmouth, N. C., 2d, 3d, 23d; Pensacola, Fla., 2d; Indianola, 17th; Victoria, Tex., 17th; Cuero, Tex., 17th, 19th; Mason, Tex., 17th, 19th; Eagle Pass, Tex., 17th; Tucson, Ariz., 18th; Florence, Ariz., 9th, 10th, 11th; Los Angeles, Cal., 27th; San Diego, Cal., 29th; Red Bluff, Cal., 9th, 10th to 14th, 18th, 24th; Visalia, Cal., 11th, 12th, 13th; Point San José, Cal., 13th, 14th; St. Augustine, Fla., 2d, very thin.

Low Temperatures.—The following are notable instances of extremely cold weather in various portions of the country attending the development and progress of areas of high barometer. *California*: San Jose, 13th, weather excessively cold during the past three days. Marysville, 13th, "phenomenally cold weather" for past two days; during the night of the 12th ice formed in gutters sufficient to bear a man's weight; temperature 9° below freezing. North San Juan, 13th, coldest weather for many years past; temperature 10° to 14° below freezing. Stockton, 13th, coldest weather for many years; ice one inch thick near the town. Fresno, 13th, weather for past 48 hours coldest ever experienced; ice formed during night, and in shady places remained all day; temperature 21° above zero. San Buenaventura, 13th, weather extremely cold; lambs and sheep dying from exposure. Los Angeles, 13th, severest weather ever known in southern California; "hills all around the city, down almost to the plains, white with snow." Merced, 13th, coldest weather for several years; ice formed more than one half inch in thickness. Alta, 13th, minimum temperature 22° below freezing; reservoirs frozen sufficient to permit skating; all mining ditches frozen rendering them temporarily useless. Yreka, 13th, minimum temperature 25° below freezing; coldest weather for several years. Campo, 12th, minimum temperature 6° 5, lowest for several years. San Geronimo, month remarkable for continued low temperatures; minimum temperature 19° on the 12th, lowest for many years. *Canada*: Parry Sound, 24th, —38°. Saugeen, 24th, —16°. Port Stanley, 24th, —10°. Toronto, 24th, —18°. Kingston, 24th, —19°. Montreal, 24th, —26°. Anticosti, 24th, —16°. Quebec, 24th, —26°. *Connecticut*: Hartford, 24th, 10° to 18° below zero, and in the surrounding towns as low as —20°. Southington, 25th, minimum temperature —14°, coldest day in past 25 years. *Massachusetts*: Boston, 24th, reports from different parts of New England show the thermometer to have fallen from 10° to 37° below zero. Worcester, 24th, coldest weather for past 12 years; in various parts of the city, thermometer from 12° to 20° below zero; in some portions of the country, the temperature fell to —26°. *Missouri*: St. Joseph, 16th, coldest day of the season; temperature 5° above zero. Carrollton, 16th, lowest temperature yet recorded for the season. Joplin, 16th, coldest of the season. Carthage, 16th, coldest of

the season. *Montana*: Fort Missoula, 29th, minimum temperature —31°, lowest since station was opened. *New Brunswick*: St. Johns, 18th, minimum temperature —28°, weather exceedingly severe. *Nevada*: Halleck, 12th, coldest weather for several years; temperature 30° below zero. Wells, 12th, exceedingly cold weather; temperature 30° below zero. Elko, 12th, temperature 25° below zero. Carlin, 12th, temperature 27° below zero; coldest weather ever experienced here. *New Jersey*: Long Branch, 24th, temperature —8°; preparations made for cutting ice. Red Bank, 24th, North Shrewsbury river frozen over; coldest weather for several years. *New Hampshire*: Colbrook, 24th, weather almost unendurable for the past two days. Portsmouth, 24th, temperature —24°; several vessels put into lower harbor, heavily encased in ice and unable to proceed further; crews suffered intensely from extreme cold and, in some cases, were frost-bitten; fishermen report the most "intense weather" at sea that it has ever been their lot to experience. Contoocookville, 24th and 25th, minimum temperature —15°; coldest days during the past 11 years. *Rhode Island*: Providence, 24th, coldest day of the season; thermometer from 10° to 15° below zero. Newport, 24th, coldest weather for past 10 years, temperature —6°; public schools closed, as it was found impossible to heat them. *New York*: Norwich, 24th, —33°; Poughkeepsie, 24th, all points along the river and from the interior of the river counties, reported the experience of intense cold; thermometer 16° to 20° below zero. Rochester 24th, —7°. Saranac Lake, 24th, —40°. Plattsburgh, 24th, —25°. Keesville, 24th, —24°. Port Henry, 24th, —22°. Ticonderoga, 24th, —25°. Whitehall, 24th, —35°. Glen's Falls, 24th, —26°. Lake George, 24th, —25°. Saratoga, 24th, —36°. *Vermont*: Burlington, 24th, maximum temperature —4°, minimum temperature —24.8°; coldest day since 1857.

PRECIPITATION.

The general distribution of rain-fall over the United States and Canada for the month of January, 1882, is exhibited upon chart No. III from the reports of over 500 stations. From the table in the left-hand corner of the chart is obtained a monthly average for each of the various districts, determined from the records of Signal Service stations, covering a period of several years, to which is subjoined a comparison of the present month with such averages. Upon comparison with the chart, the tabulated averages show four very irregular areas of excess and deficiency. The former condition prevails and the areas embrace the entire eastern portion of the country, except the South Atlantic States and the Florida Peninsula, while to the west of the Mississippi they include the Extreme Northwest, Middle and Southern Slopes, Western Gulf States, Rio Grande Valley, and the Southern and Northern Plateaux. The departures of excess range from 0.11 inch in the Lower Lake Region to 9.92 inches in Tennessee. The excess in this State, for the present month, is the largest and most remarkable since the opening of Signal Service stations. The most serious floods have resulted from this marked and sudden increase of precipitation, and the consequent damage to property has been almost without precedent. The areas of deficiency are comparatively small and widely separated, and the departures range from 0.11 inch in the Middle Plateau to 4.42 inches in the Middle Pacific Coast region. The deficiency on the Pacific coast, especially in the two northern districts, is very large and quite unusual for the month. As a means of interesting comparison, the following maximum departures from the normal are given for each year since 1873, together with the corresponding districts: 1874, large excess, Lower Lake region; 1875, +3.02 inches, South Atlantic States; 1876, +3.15 inches, Ohio Valley and Tennessee, and —2.15 inches, South Atlantic States; 1877, —1.50 inches, Pacific Coast Regions, and —0.95 inch, Western Gulf States; 1878, +3.76 inches, Middle and South Pacific Coast Regions, and +2.17 inches, New England; 1879, +3.43 inches, Tennessee, and —2.12 inches, Eastern Gulf States; 1880, +6.21 inches, Portland, Or., —3.05 inches, Eastern Gulf States, and —2.45 inches, Middle and South Pacific Coast Regions; 1881, +3.80

inches, Florida Peninsula and +3.62 inches, Eastern Gulf States.

Deviations from Average Precipitation.—Under this heading departures exhibited by the reports from regular Signal Service stations are shown in the table of comparative monthly rainfalls, as published in the lower left-hand corner of chart No. III. The following items of importance in connection with this subject are reported by Voluntary Observers: *California*: Rio Vista, monthly rainfall considerably below the average. *Connecticut*: Southington, monthly rainfall considerably above the average. *Illinois*: Riley, monthly rainfall 1.57 inches, or 0.27 inch below the average for the past 21 years. *Indiana*: Vevay, monthly rainfall considerably below the average. *Kansas*: Yates Centre, monthly rainfall 0.25 inch above the average for the past 2 years. Lawrence, monthly rainfall 0.70 or inch, 0.56 inch below the average for the past 14 years. Manhattan, monthly rainfall 0.42 inch, or 0.28 inch below the average for the past 22 years; the largest rainfall (2.35 inches) during this period occurred in 1878, and the lowest (0.05 inch) occurred in 1870. Wellington, monthly rainfall 1.05 inch, or 0.59 inch above the average for the past 3 years. *Iowa*: Clinton, monthly rainfall considerably below the average. *Maine*: Gardiner, monthly rainfall 3.56 inches, or 0.31 inch above the average for the past 46 years. *Maryland*: Fallston, monthly rainfall 6.63 inches, or 3.40 inches above the average for the past 11 years, and 1.63 inches more than the maximum January rainfall for that period, which occurred in 1877. Sandy Springs, monthly rainfall considerably above the average for the past 10 years. *Michigan*: Thornville, monthly rainfall considerably below the average. *Missouri*: St. Louis, Missouri Weather Service reports monthly rainfall slightly above the average for the past 45 years. *New Hampshire*: Contoocookville, monthly rainfall 3.10 inches, or 1.10 inch above the average for the past 12 years. *New York*: Palermo, monthly rainfall 2.95 inches, or slightly above the average for the past 29 years; the largest January rainfall, 5.30 inches, occurred in 1874, and the smallest, 1.50 inches, occurred in 1866 and 1869; the snowfall for January, 1882, is less than for any January during the past 29 years. North Volney, monthly rainfall 2.70 inches, or 0.56 inch below the average for the past 9 years. *Tennessee*: Ashwood, monthly rainfall largely above the average, and the heaviest for the past 20 years. *West Virginia*: Helvetia, monthly rainfall 9.50 inches, or 4.56 inches above the average for the past 6 years; Wytheville, monthly rainfall 7.08 inches, or 3.56 inches above the average for the past 16 years.

Special Heavy Rainfalls.—4th, College Hill, Ohio, 2.50 inches. 10th and 11th, Clarksville, Tex., 2.50 in 9 hours and 30 minutes. 11th, Murphy, N. C., 2.80. 12th, San Diego, Cal., 2.49; Poway, Cal., 3.79. 12th and 13th, Austin, Tenn., 3.00 in 30 hours. 15th, 16th and 17th, Murphy, N. C., 5.10. 16th, Memphis, 2.97; Lexington, Mo., 2.50. 20th and 21st, Austin, Tenn., 2.60 in 24 hours. 21st, Fayette, Miss., 3.00. 24th, Galveston, 2.60. 27th, Ashwood, Tenn., 2.60. 27th and 28th, Forest Hill, N. C., 2.90 in 25 hours. 28th, Knoxville, 2.97; Helena, Ark., 2.80.

Largest Monthly Rainfalls, including Melted Snow.—Austin, Tenn., 18.11 inches; Ashwood, Tenn., 18.10; Knoxville, 16.98; Murfreesboro, Tenn., 16.30; Chattanooga, 14.74; Nashville, Tenn., 14.49; Murphy, N. C., 13.95; Vicksburg, 13.83; Decatur, Ala., 13.70; Helena, Ark., 13.17; Memphis, 12.87; Fayette, Miss., 12.70; Cisco, Cal., 11.71; White Plains, N. Y., 11.50; Highlands, N. C., 11.32; New Ulm, Tex., 10.55; Helvetia, W. Va., 9.50; Colfax, Cal., 9.09; Shreveport, 9.08; Forest Hill, N. C., 8.90; Portsmouth, Ohio, 8.82; Paducah, Ky., 8.70; New Shoreham, R. I., 8.57; Clarksville, Tex., 8.50; Mt. Ida, Ark., 8.40; Little Rock, Ark., 8.17; Galveston, 8.15; Confluence, Pa., 7.90; Ft. Gaston, Cal., 7.72; Summit, Cal., 7.40; Green Springs, Ala., 7.36; College Hill, O., 7.25; Charlotte, N. C., 7.24; Mt. Washington, 7.20; Ft. Canby, Wash. Ter., 7.16; Washington, D. C., 7.09; Wytheville, Va., 7.08; Federalsburg, Md., 7.01; Ft. Stevens, Or., 6.95; Cape Henry,

Va., 6.92; New London, 6.90; Halifax, N. S., 6.84; Morgantown, W. Va., 6.78; Mobile, 6.77; Accotink and Johnsonstown, Va., 6.75; Atlantic City, 6.74; Weldon, N. C., 6.64; Fallston, Md., 6.63; Quebec, 6.58; Newport, R. I., 6.55; Evansville, Ind., 6.50; New Geneva, Pa., 6.48; Sandy Hook, 6.47; Vineyard, N. J., 6.45; Great Falls, Md., 6.44; Norfolk, Va., Atlanta, Ga., Poway, Cal. and Truckee, Nev., 6.40; Bowling Green, Ky., 6.39; West Chester, Pa., 6.38; Cairo, 6.35; Flemington, W. Va., 6.33; Atco, N. J., 6.32; Jacksonburg, Ohio, 6.30; Louisville, 6.29; Yarmouth, N. S., 6.21; New York, 6.15; Golconda, Ill., 6.05; Lenoir, N. C., 6.00.

Smallest Monthly Rainfalls, including Melted Snow.—Yankton, 0.04 inch; Mojave, Cal. and Ft. Meade, Dak., 0.05; Smithville, Dak., 0.08; San Simon, Ariz., 0.12; Huron, Dak. and Cheyenne, 0.14; Ft. Keogh, Mont. and Macon, Mo., 0.18; Ft. Randall and Rapid City, Dak., Golconda, Nev., Ft. Assinaboine, Mont. and Ft. Wallace, Kan., 0.20; Ft. Snelling, Minn., 0.22; Bismarek and Ft. Sully, Dak. and Corning, Mo., 0.23; Brunswick, Mo., 0.25; Ft. Buford, Dak., 0.26; Hannibal, Mo. and Punta Rassa, Fla., 0.30; Ft. Union, N. M. and Lemoore, Cal., 0.32; Deadwood, Dak. and Ft. Elliott, Tex., 0.33; Terrace, Utah, 0.35; Pioche, Nev., 0.38; Hot Springs and Browns, Nev., 0.39; Benson, Ariz., Ft. Custer, Mont., Camp near Presidio, Tex., Ft. Fetterman, Wyo. and Tecoma, Nev., 0.40; Manhattan, Kan., 0.42; Newhall, Cal. and Ft. Stevenson, Dak., 0.43; Burlington, Vt. and Ft. Supply, Ind. Ter., 0.44; Almoda, Wash. Ter., Blue Creek, Utah, Terry's Landing, Mont. and Genoa, Neb., 0.45; North Platte, Neb., 0.46; Northfield, Minn. and Santa Fe, N. M., 0.47; Ft. Totten, Dak. and Clinton, Iowa, 0.48; Oakland, Cal., 0.49; Ft. Yates, Dak., Ft. Ringgold, Tex., Minneapolis, Minn., Nora Springs, Iowa and Chillicothe, Mo., 0.50.

Rainy Days.—The number varied in New England from 18 to 26; Middle Atlantic States, 16 to 24; South Atlantic States, 11 to 24; Florida Peninsula, 7 to 8; East Gulf States, 13 to 22; West Gulf States, 9 to 24; Rio Grande Valley, 12 to 22; Ohio Valley and Tennessee, 13 to 27; Lower Lake Region, 16 to 25; Upper Lake Region, 11 to 22; Extreme Northwest, 6 to 19; Upper Mississippi Valley, 11 to 19; Missouri Valley, 4 to 10; Northern Slope, 5 to 14; Middle Slope, 3 to 11; Southern Slope, 3 to 15; Southern Plateau, 5 to 11; Middle Plateau, 9 to 14; Northern Plateau, 12 to 20; North Pacific Coast Region, 18 to 23; Middle Pacific Coast Region, 8 to 11; South Pacific Coast Region, 5 to 9.

Cloudy Days.—The number varied in New England from 7 to 24; Middle Atlantic States, 11 to 19; South Atlantic States, 6 to 23; Florida Peninsula, 1 to 4; East Gulf States, 9 to 23; West Gulf States, 3 to 22; Rio Grande Valley, 15 to 25; Ohio Valley and Tennessee, 16 to 23; Lower Lake Region, 13 to 22; Upper Lake Region, 6 to 16; Extreme Northwest, 3 to 8; Upper Mississippi Valley, 7 to 14; Missouri Valley, 4 to 13; Northern Slope, 3 to 13; Middle Slope, 0 to 6; Southern Slope, 6 to 17; Southern Plateau, 3 to 10; Middle Plateau, 4 to 11; Northern Plateau, 12 to 18; North Pacific Coast Region, 13 to 18; Middle Pacific Coast Region, 5 to 8; South Pacific Coast Region, 3 to 7.

Snow.—The dates on which snow fell in the various districts are as follows: New England, 1st to 31st; Middle Atlantic States, 1st to 7th, 9th to 22d, 24th to 29th, 31st; South Atlantic States, 1st, 2d, 4th, 5th, 6th, 13th, 17th, 22d, 25th, 29th, 30th, 31st; West Gulf States, 16th to 20th, 29th, 30th; Rio Grande Valley, 17th; Tennessee, 1st, 17th, 30th, 31st; Ohio Valley, 1st to 6th, 10th to 13th, 15th to 25th, 29th, 30th, 31st; Lower Lake Region, 1st to 4th, 6th, 7th, 9th to 17th, 19th to 25th, 29th, 30th, 31st; Upper Lake Region, 1st to 29th; Extreme Northwest, 1st, 3d, 4th, 5th, 7th, 8th, 12th, 13th, 17th to 21st, 23d, 24th, 27th, 30th, 31st; Upper Mississippi Valley, 1st to 6th, 8th, 10th to 16th, 18th, 20th, 21st, 23d to 26th, 28th, 30th, 31st; Missouri Valley, 1st to 5th, 8th, 10th, 12th, 13th, 15th to 18th, 21st, 23d, 24th, 26th, 27th, 30th, 31st; Northern Slope, 1st to 28th, 30th, 31st; Middle Slope, 4th, 7th to 12th, 15th to 18th, 24th, 25th, 29th, 30th; Southern Slope, 16th, 18th, 29th,

30th; Southern Plateau, 7th to 20th, 24th, 25th, 26th, 28th, 29th, 30th; Middle Plateau, 3d, 4th, 6th to 15th, 18th, 19th, 23d to 27th, 30th, 31st; Northern Plateau, 1st, 3d to 7th, 9th to 14th, 16th, 18th, 19th, 20th, 23d to 31st; North Pacific Coast Region, 8th, 10th, 11th, 25th, 26th, 27th, 30th; South Pacific Coast Region, 12th to 15th. Particularly heavy or remarkable snow-falls were reported as follows: Los Angeles, Cal., 13th, hills all about the city white with snow. In the San Geronio Pass, two special freight trains were blockaded. The cuts in the Pass were filled to a depth of from six to eight feet with drifted snow. Beyond the Pass, on the Colorado desert, it rained heavy all night. Riverside, San Bernardino Co., Cal., 13th, snow five inches and still falling; good sleighing in the orange groves. Tucson, Ariz., 12th, very heavy snow during the night on the desert west of station. 13th, fierce snow storm raged in the mountains. Campo, Cal., 13th, snow fell to the depth of 20 inches; a brisk easterly wind prevailed at the time, which was remarkable owing to the fact that winds from that point are very seldom accompanied by precipitation; "all communication with the outside world cut off." 14th, ceased snowing at 10.20 a. m. 15th, nearly three feet of snow on the ground; many drifts eight feet deep; most remarkable storm ever known here; hundreds of birds were killed by exposure and stock suffered severely. 16th, all communication still cut off. 18th, snow slowly disappearing; reports from surrounding country show great losses in stock; roads still impassable. 19th, snow slowly disappearing. Petersburg, Va., 1st, snow fell to the depth of 10 inches; trains delayed and all traffic suspended. Gore, Ohio, 4th, trains delayed and travel of all kinds generally impeded. Circleville, Ohio, 4th, all railroad traffic suspended. Cincinnati, 4th, snow fell to a depth of 10 inches, seriously impeding travel. South Lee, Mass., 31st, very heavy storm continuing for 24 hours, snow fell to a depth of 25 inches; all communication seriously interfered with. Worcester, Mass., 31st., heaviest snow for years. At many places throughout the western portion of the state it fell to the depth of from 20 to 25 inches on the level. Great obstruction to travel, particularly on railroads; heavy snow plows used night and day to keep the tracks clear. Sherman, Tex., 16th, snow and sleet all day. Fredonia, Kan., 16th, severe snow blizzard, most violent for several years; wind from the north estimated at 40 miles per hour. Shreveport, La., 29th, snowed furiously from 2.25 to 2.30 p.m., the flakes being remarkably large. San Geronio, Cal., 12th, remarkable fall of snow in the surrounding country. From San Bernardino eastward to the edge of the desert and from San Diego southward, snow fell to a depth of from 4 to 15 inches. There is no record of any such storm in former years, but some of the old Mexican inhabitants speak of a similar storm as occurring some 50 years ago. The storm was further noteworthy from the fact that it came from the east and was accompanied by a violent gale from that quarter, whereas the east wind is usually remarkable for its entire want of moisture.

Largest Monthly Snow-falls.—Cisco, Cal., 81 inches; Summit, Cal., 65.5; Truckee, Nev., 62; Mt. Washington, about 54; Worcester, Mass., 53; Eagle Rock, Idaho, 44.1; Amherst, Mass., 40; Boca, Nev., 30; Cornish, Me., 36.5; Alpena, Mich., 36; Dyberry, Pa., 35; Antrim, N. H., 33; Springfield, Mass., about 32; Lunenburg, Vt., 31.5; Gardiner, Me., 31.2; Ardenia, N. Y., Grafton, Auburn and Contoocookville, N. H., and Rowe, Mass., 31; Somerset, Mass., and Orono, Me., 30; Milton, Pa., 29.5; Catawissa, Pa., 28.6; South Orange, N. J., 28.2; Dexter, Me., 28; Eastport, Me., and Thatcher's Island, Mass., about 27; Escanaba, about 26; Wells, Nev., 25.5; Prescott, Ariz., 25.3; New York City, about 25; Westborough, Mass., 25; Deer Park, Md., 24.7; Oswego, 24.6; Fall River, Mass., 24.5; Paterson, N. J., 24.3; Strafford, Vt., 23; Boston, about 23; Chester, Pa., 21.7; Flushing and White Plains, N. Y., and Colfax, Cal., 21; Woodstock, Vt., 20.5; Fallston, Md., Alta, Cal., and College Hill, O., 20; Williamsport, Pa., about 20; Johnstown, N. Y., 19.4; Emmitsburg, Md., and Vevay, Ind., 19; Grand Haven, 18.9; Southington, Conn., 18.5; Jacksonburg, O., and

New London, Conn., about 18; Pike's Peak, 17.8; Northport, Mich. and Rising Sun, Ind., 17.5; Albany, N. Y., and Sandy Springs, Md., 17; Pittsburg, about 17; Newport, Vt., 16.7; San Geronio, Cal., 16.5; Silver City, N. M., 16.3; Meadville, and Germantown, Pa., and Cumberland, Md., 16; Baltimore, about 16; Flemington, W. Va., 15.2; Cincinnati, 15.1; Phillipsburg and Somerville, N. J., Portsmouth, O., and Battle Mountain, Nev., 15; Johnstown, Va., 14.7; Elko, Nev., 14.5; Columbus, O., about 14.5; Princeton, N. J., 14.2; Wellsburg, Pa., and Halleck, Nev., 14; Erie, 13.8; Helvetia, W. Va., 13.7; Charleston, Ill., and Waterburg, N. Y., 13.5; Port Huron, about 13.5; Moorhead, Minn., 13.4; Carlin, Nev., 13; Fallsington, Pa. and Palisade, Nev., 12.7; New Athens, O. and Neillsville, Wis., 12.5; Embarrass, Wis., Spiceland, Ind., Corinne, Utah, Bethel, O. and Acetotink, Va., 12; Indianapolis, about 11.8; Weldon, N. C. and Cairo, 11.7; New Shoreham, R. I., 11.6; Woodstock, Md., Vineland, N. J. and Logan, Ia., 11; Wellsburg, W. Va., 10.7; Wythville, Va., Promontory, Utah, Ft. Missoula, Mont., Winnemucca, Nev. and North Lewisburg, O., 10.5; Eola, Or., Kelton, Utah, and Colton, Cal., 10.

Depth of Snow on Ground at the end of Month.—*Arizona:* Prescott, 8 inches. *Arkansas:* Mt. Ida, 4 inches; Little Rock, 5 inches. *California:* San Geronio, 4½ inches. *Colorado:* Pike's Peak, 6 inches. *Connecticut:* Southington, 14 inches; New London, 4 inches; New Haven, 8 inches. *Dakota:* Ft. Stevenson and Huron, ½ inch. *District of Columbia:* Washington, 6 inches. *Idaho:* Eagle Rock, 8½ inches. *Illinois:* Anna, 3 inches; Champaign, ½ inch; Swanwick, 2 inches; Springfield, ¾ inch; Cairo, 5 inches. *Indiana:* Vevay, 5 inches; New Corydon, 2 inches; New Harmony, 7 inches; St. Meinrad, 5½ inches; Spiceland, 3 inches; Rising Sun, 9 inches; Indianapolis, 2½ inches. *Indian Territory:* Fort Gibson, 2.4 inches. *Iowa:* Guttenburg, trace; Nora Springs, ½ inch. *Kansas:* Yates, Centre, Holton and Independence, 1 inch; Council Grove, 1½ inches; Wellington, 3 inches; Dodge City and Leavenworth, ½ inch. *Kentucky:* Bowling Green, 5½ inches; Louisville, trace. *Maine:* Orono, 10 inches; Gardiner, 15 inches; Eastport, 8 inches. *Maryland:* Woodstock, 11 inches; Deer Park, 6 inches; Sandy Springs, 5½ inches; Cumberland, 10 inches; Federalsburg, 2½ inches; Fallston, 8 inches; Baltimore, 4 inches. *Massachusetts:* Springfield, 22 inches; Fall River, 7 inches; Somerset, 14 inches; Rowe, 15 inches; Amherst and Worcester, 26 inches; Thatcher's Island, 15 inches; Boston, 6 inches. *Michigan:* Northport, 5 inches; Battle Creek, ½ inch; Marquette, 1½ inches; Escanaba, 4 inches; Alpena, 3 inches. *Minnesota:* Northfield, 2½ inches; St. Vincent, 1½ inches; St. Paul and Duluth, less than one inch; Moorhead, 8 inches. *Missouri:* Springfield, 1 inch; St. Louis, ¾ inch. *Montana:* Ft. Assiniboine, 1 inch; Ft. Missoula, 1½ inches; Ft. Benton and Custer, 2 inches; Ft. Shaw, about 1 inch. *Nebraska:* De Soto, trace. *Nevada:* Carson City, 5 inches; Winnemucca and Pioche, 3 inches. *New Hampshire:* Grafton, 20 inches; Auburn, 18 inches; Contoocookville, 10 inches; Mt. Washington, 17 inches. *New Jersey:* Vineland, 2 inches; Freehold, 4½ inches; South Orange, 12 inches; Princeton and Phillipsburg, 6 inches; Somerville, 5 inches; Sandy Hook, 2½ inches; Atlantic City, trace. *New Mexico:* Santa Fe, trace to 6 inches; Silver City, 1 inch. *New York:* Johnstown, 4 inches; Ardenia, 14 inches; Flushing, 10 inches; Cooperstown, 4 inches; Waterburg, 1 inch; Palermo, trace; White Plains, 4 inches; Oswego, trace; New York City, 13 inches; Albany, 4½ inches. *North Carolina:* Murphy, 1 inch; Highlands, ¾ inch. *Ohio:* College Hill, 5 inches; Westerville and North Lewisburg, 2 inches; Ruggles, 1 inch; New Athens, 5½ inches; Jacksonburg, 5 inches; Wooster, 1½ inches; Columbus, 3½ inches; Cincinnati, 3½ inches. *Oregon:* Umatilla, ½ inch; Eola, 2 inches. *Pennsylvania:* Dyberry, 22 inches; Milton, 17½ inches; Fallsington and West Chester, 8 inches; New Castle, 3 inches; Meadville, 2½ inches; Catawissa, 15 inches; Wellsboro, 6 inches; Pittsburg, 5 inches; Philadelphia, 2 inches; Williamsport, 10 inches. *Rhode Island:* New Shoreham, 6 inches;

Newport, 5 inches. *Tennessee*: Ashwood, 2½ inches; Nashville, 2 inches; Memphis, 4 inches; Chattanooga, 1 inch. *Texas*: Henrietta, 1½ inches; Denison, trace. *Utah*: Coalville, 4 inches; Salt Lake City, 1 to 3 inches. *Vermont*: Newport, 3 inches; Strafford and Woodstock, 6 inches; Burlington, ½ inch. *Virginia*: Accotink and Wytheville, 5 inches; Lynchburg, 3½ inches. *Washington Territory*: Dayton, 3 inches; Olympia, 2 inches. *West Virginia*: Morgantown and Wellsburg, 5 inches; Helvetia, 4 inches; Flemington, 2 inches. *Wisconsin*: Neillsville, 7 inches; Embarrass, 5 inches; La Crosse, 3½ inches; Madison, trace.

Rain or Snow from a Cloudless Sky.—Burlington, Vt., 2d, 4th, light snow; 22d, light snow at intervals during the day and night. Mobile, 10th, 7.45 p. m., light rain, lasting about five minutes, during which 0.01 inch fell. Buffalo, 22d, light snow. Dubuque, Ia., 2d, light snow from 8.05 to 8.25 a. m.; Ardenia, N. Y., 24th, between 4 and 5 p. m.

Hail.—Portland, Or., 25th; San Francisco, 24th, during a heavy shower of rain at 3.40 p. m., hail was reported to have fallen in several sections of the city. Sacramento, Cal., 31st. Red Bluff, Cal., 23d, hail-stones size of peas; 25th, from 5.10 to 5.15 p. m., size of peas; Visalia, Cal., 10th, 6 p. m., a sudden and heavy fall of hail lasting 10 minutes; Fort Canby, Wash. Ty., 31st.

Sleet.—The dates on which sleet fell in the various districts are as follows: New England, 1st, 6th, 8th to 11th, 13th, 16th, 26th, 27th; Middle Atlantic States, 4th, 5th, 8th to 12th, 16th to 19th, 22nd, 25th, 26th, 28th, 31st; South Atlantic States, 1st, 25th, 26th, 30th, 31st; East Gulf States, 29th; West Gulf States, 16th, 17th, 18th, 29th; Rio Grande Valley, 17th; Ohio Valley and Tennessee, 3rd, 4th, 6th, 10th, 12th, 13th, 15th to 18th, 24th, 25th, 30th, 31st; Lower Lake Region, 6th, 10th, 12th, 21st, 25th; Upper Lake Region, 6th, 7th, 8th, 13th, 26th; Upper Mississippi Valley, 4th to 7th, 10th, 12th, 16th, 20th, 24th, 26th; Missouri Valley, 4th, 10th, 16th, 26th, 30th; Northern Slope, North Platte, 12th; Middle Slope, 10th, 12th, 16th, 20th, 24th, Southern Slope, 16th, 17th, 29th; Southern Plateau, Tucson, 16th; Middle Plateau, Pioche, 24th; Northern Plateau, Fort Missoula, Mont., 2nd, and Dayton, Wash. Ter., 25th.

RELATIVE HUMIDITY.

The percentage of mean relative humidity for the month ranges as follows: New England, from 68 to 77; Middle Atlantic States, 69 to 87; South Atlantic States, 70 to 87; Florida Peninsula, 76 to 79; East Gulf States, 75 to 84; West Gulf States, 71 to 90; Rio Grande Valley, 78 to 91; Ohio Valley and Tennessee, 73 to 83; Lower Lake Region, 71 to 86; Upper Lake Region, 70 to 87; Extreme Northwest, 66 to 95; Upper Mississippi Valley, 63 to 78; Missouri Valley, 64 to 72; Northern Slope, 56 to 75; Middle Slope, 47 to 74; Southern Slope, 48 to 81; Southern Plateau, 54 to 64; Middle Plateau, 53 to 72; Northern Plateau, 73 to 85; North Pacific Coast Region, 83 to 85; Middle Pacific Coast Region, 68 to 70; South Pacific Coast Region, 57 to 70. *High stations* report the following percentages not corrected for altitude: Santa Fe, 67.9; Denver, 56.8; Pike's Peak, 77.4; Mt. Washington, 86.1.

WINDS.

The prevailing winds during the month of January, 1882, at Signal Service stations, are shown on chart No. II, by arrows which fly with the wind. In the Middle Atlantic States and New England the winds are *northwesterly*; in the South Atlantic States, *southwesterly*; in the Gulf States and Florida Peninsula, *southerly*; in the Ohio Valley and Tennessee, *south-west to northwest*; in the Lake Region, *southwesterly*; in the Upper Mississippi and Lower Missouri Valleys and in the Red River of the North Valley, *southerly*; in the Northern Slope, *northwesterly*; in the Middle and Southern Slopes, *south to west*; in the Plateau Regions, *variable*; in the North Pacific Coast Region, *southerly* and in California, *northerly*.

Total Movements of the Air.—The following are the largest total movements at Signal Service stations: Mt. Washington,

28.892 miles; Pike's Peak, 19.172; New Shoreham, R. I., 13.733; Delaware Breakwater, 13.423; Thatcher's Island, Mass., 12.602; Sandy Hook, 11.955; Hatteras, 11.501; Kittyhawk, 11.436; Cape May, 11.310; Sandusky, 10.841; Rochester, 10.793; Buffalo, 10.651; Barnegat, 10.557; Grand Haven, 10.292; Indianola, 10.135; Ft. Shaw, Mont., 10.039; Cape Henry, Va., 9.879; Newport R. I., 9.612; Eastport, 9.386; Chincoteague, Va., 9.301; Portsmouth, N. C., 9.280; Oswego, 9.125; Champaign, Ill., 9.070; Milwaukee, 8.962; Macon, N. C., 8.960; Erie, 8.908; Huron, Dak., 8.829; Boston, 8.742; Cleveland, 8.609; Galveston, 8.597; Detroit, 8.536; Dodge City, 8.500; Cheyenne, 8.328; Ft. Elliott, Tex., 8.301; Burlington, Vt., 8.185; Port Huron, 8.160; Marquette, 8.134; Atlanta, 8.088; North Platte, 8.046; Ft. Assinnaboine, Mont., 8.040. The *smallest* are: La Mesilla, N. M., 1.221; Rio Grande, Tex., 1.236; Roseburg, Or., 1.762; Ft. Missoula, Mont., 1.800; Salt Lake City, 2.100; Florence, Ariz., 2.177; Lynchburg, 2.338; Silver City, N. M., 2.541; Tucson, Ariz., 2.812; Boise City, Idaho, 2.863.

High Winds.—The following are maximum velocities, with direction at time of occurrence, for the various dates on which 50 miles per hour was exceeded, on the summit of Mt. Washington; 100 miles, NW., 2d; 70, NW., 3d; 88, N., 4th; 68, S., 6th; 82, NW., 7th; 92, W., 8th; 100, NW., 9th; 80, NW., 10th; 100, NW., 11th; 88, NW., 12th; 100, W. and SW., 13th; 110, NW., 14th; 120, NW., 15th; 65, NW., 16th; 97, NW., 17th; 88, W., 18th; 60, NW., 19th; 60, NW., 20th; 60, SW., 21st; 120, NW., 22d; 88, NW., 23d; 96, NW., 24th; 67, NW., 25th; 65, NW., 26th; 126, NW., 27th; 72, SW., 28th; 120, NW., 29th; 116, NW., 30th; 58, NW., 31st. On the summit of Pike's Peak the following maximum velocities were reported: 62 miles, NW., 1st; 54 W. and NW., 5th; 50, SW., 6th; 50, NW., 21st; 54, SW., 24th; 52, W., 26th. Other stations reporting velocities of 50 miles per hour or over are as follows: Ft. Stevenson, Dak., 56, NW., 17th; Indianola, 53, N., 16th; Grand Haven, 50, NW., 26th; Sandusky, 51, W., 22d; Buffalo, 51, SW., 27th; Rochester, 56, W., 27th; Champaign, Ill., 52, W., 26th; Thatcher's Island, Mass., 52, NE., 2d, and 57, NW., 27th; New Shoreham, R. I., 50, N., 1st and 2d, and 55 NE., 31st; Sandy Hook, 54, E., 31st; Cape May, 54, NW., 14th, 63, W., 22d, and 52, NW., 29th; Delaware Breakwater, 52, NW., 22d and 29th; Cape Henry, Va., 52, NW., 1st.

Local Storms.—Most of the following storms attended the development and progress of low areas Nos. XII and XIII. The latter rapidly succeeded the former and pursued its general course, and the partial restoration of atmospheric equilibrium between the passage of the two storm centres caused sudden and violent westerly gales at many points in the northern districts. Ventura Co., Cal., 12th, very violent wind storm (said to be a tornado) occurred in the Ojai valley, destroying houses and barns and uprooting and breaking off the strongest trees. Wilmington, Cal., 12th, most terrible storm for many years, accompanied by a blinding fall of snow and sleet; several vessels dragged anchor in the harbor, and one of them became a total wreck. Oakland, Cal., 13th, heavy northerly gale, signs destroyed, fences blown down, trees uprooted, wind mills dismantled and several houses damaged. Martinsburg, N. Y., 26th, very violent wind storm, over 25 buildings more or less demolished. Lowville, N. Y., many buildings unroofed and some entirely demolished. Harrisburg, N. Y., 27th, barns unroofed. Greig, N. Y., 27th, barns and houses unroofed and other property damaged. Constableville, N. Y., 27th, barns unroofed, fences blown down and trees uprooted. High Market, N. Y., 27th, several buildings unroofed. San Diego, Cal., 12th, most remarkable storm since 1847, a period of 34 years; continuing for 38 hours, it gave the largest rainfall of any one storm in the month of January during the above period, and the largest but two of all the storms recorded. It was especially remarkable as being the coldest storm of which there is any record. On the morning of the 14th snow-flakes were observed, melting as fast as they fell, a phenomenon